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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,044

08/26/2003

Tohru Watanabe

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7590

12/15/2006

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EXAMINER

KHAN, USMAN A

ART UNIT

PAPER NUMBER

2622

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/648,044	Applicant(s) WATANABE, TOHRU	
	Examiner Usman Khan	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 08/26/2003 has been considered by the examiner. The submission is in compliance with the provisions of 37 CFR 1.97.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 6, and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In each of these claims applicant states that "the first color component, the second color component, and the third color component are three optical primary colors, that is, red, green, and blue, and the second color component is green". It is not clear if the applicant is emphasizing that there are two separate green color components or if the second color component is green. In addition, it is unclear if the "three optical colors" must be red, green, blue or are optionally red,

green, blue due to the unclear "that is" phrase set forth in the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada (US PgPub 2002/0171033), in further view of Whipple et al. (US patent No. 5,926,215), in further view of Endo et al. (US patent No. 5,392,070), and in further view of Examiners Official Notice.

Regarding **claim 1**, Okada discloses an image capturing device, comprising: a solid Image capturing element having a plurality of light receiving pixels arranged in a matrix (figure 3 and 7, item 11i), for accumulating information charges therein, the light receiving pixels in an odd-numbered line being alternately correlated to a first color component and a second color component (figure 3; odd rows i.e. rows 1, 3, 5, etc. including colors R and G) and the light receiving pixels in an even-numbered line being alternately correlated to the second color component and a third color component (figure 3; even rows i.e. rows 2, 4, 6, etc. including colors G and B), the light receiving pixels being connected to a plurality of vertical shift registers (figures 3 and 7; item 11s, and paragraph 0038), outputs from the plurality of vertical shift registers being

respectively coupled to respective bits of a horizontal shift register (figures 3 and 7; item 11h, and paragraph 0038), an output from the horizontal shift register being coupled to an output section (figures 3 and 7; paragraph 0019); a driving circuit for transferring the information charges accumulated in the plurality of light receiving pixels from the plurality of vertical shift registers to the horizontal shift register (figure 7; item 12), for combining, during a process of transferring the information charges, the information charges for every k-number of lines to thereby create a first combined charge and a second combined charge which are alternately accumulated in the respective bits of the horizontal shift register (paragraph 0041 *et seq.*; plurality of bit regions), sent from the horizontal shift register in the units of one bits, for m-number of bits in the output section (paragraph 0019 *et seq.*).

However, Okada fails to teach that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge. Whipple et al., on the other hand teaches that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge.

More specifically, Whipple et al. teaches that the first combined charge being a combination of the first color component and the second color component, the second

combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge (figure 5, and column 3 lines 1 *et seq.*; first output being a combination of G and R and the second output being a combination of B and G).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Whipple et al. with the teachings of Okada because in column 2 lines 6 – 12, Whipple et al. teaches that the scanning of the rows in this manner will increase the readout of the sensor and will preserve the color pixel pattern of the sensor.

However, Okada in further view of Whipple et al. fails to teach that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output. Endo et al., on the other hand teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted

according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output.

More specifically, Endo et al. teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio (figure 5 items 51, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio (figure 5 items 52, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio (figure 5 items 53, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio); and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output (it is obvious when Endo et al. invention of multiple outputs are combined with

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Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), a second image signal in response to the second output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), and a third image signal in response to the third output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Endo et al. with the teachings of Whipple et al. and Okada because in column 20 lines 59 et seq. Endo et al. teaches that the invention can be used to correct defective pixels.

However, Okada in further view of Whipple et al. and Endo et al. fails to disclose a signal processing circuit for applying predetermined signal processing to an image signal produced by the sample hold circuit, wherein the signal processing circuit generates color component signals respectively expressing the first color component, the second color component, and the third color component, using the first image signal, the second image signal, and the third image signal.

The examiner takes Official Notice that it is old and well known in the art to have processing on a signal output from a sample and hold circuit.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have signal processing on a signal output from a

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sample and hold circuit to improve image quality in a variety of ways including: sharpening, noise reduction, color manipulation, etc.

Regarding **claim 2**, as mentioned above in the discussion of claim 1, Okada in further view of Whipple et al. in further view of Endo et al. and in further view of Examiners Official Notice teaches all of the limitations of the parent claim. Additionally, Okada teaches that the first color component, the second color component, and the third color component are three optical primary colors, that is, red, green, and blue, and the second color component is green (paragraph 0040).

Regarding **claims 3 and 4**, as mentioned above in the discussion of claim 1, Okada in further view of Whipple et al. in further view of Endo et al. and in further view of Examiners Official Notice teaches all of the limitations of the parent claim. However, Okada in further view of Whipple et al., Endo et al., and Examiners Official Notice fails to the information charges are combined for every three lines and every four lines respectively and the combined charges held in three bits and four bits respectively of the horizontal shift register are accumulated in the output section. The examiner takes Official Notice that it is old and well known in the art to have more than two lines scanned and combined from an image sensor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine more than two scanned lines to improve image quality by having more pixels to implement in the processing of the image.

Regarding **claim 5**, Okada discloses an image capturing device, comprising: a solid Image capturing element having a plurality of light receiving pixels arranged in a matrix (figure 3 and 7, item 11i), for accumulating information charges therein, the light receiving pixels in an odd-numbered line being alternately correlated to a first color component and a second color component (figure 3; odd rows i.e. rows 1, 3, 5, etc. including colors R and G) and the light receiving pixels in an even-numbered line being alternately correlated to the second color component and a third color component (figure 3; even rows i.e. rows 2, 4, 6, etc. including colors G and B), the light receiving pixels being connected to a plurality of vertical shift registers (figures 3 and 7; item 11s, and paragraph 0038), outputs from the plurality of vertical shift registers being respectively coupled to respective bits of a horizontal shift register (figures 3 and 7; item 11h, and paragraph 0038), an output from the horizontal shift register being coupled to an output section (figures 3 and 7; paragraph 0019); a driving circuit for transferring the information charges accumulated in the plurality of light receiving pixels from the plurality of vertical shift registers to the horizontal shift register (figure 7; item 12), for combining, during a process of transferring the information charges, the information charges for every k-number of lines to thereby create a first combined charge and a second combined charge which are alternately accumulated in the respective bits of the horizontal shift register (paragraph 0041 *et seq.*; plurality of bit regions), sent from the horizontal shift register in the units of one bits, for m-number of bits in the output section (paragraph 0019 *et seq.*).

However, Okada fails to teach that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge. Whipple et al., on the other hand teaches that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge.

More specifically, Whipple et al. teaches that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge (figure 5, and column 3 lines 1 *et seq.*; first output being a combination of G and R and the second output being a combination of B and G).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Whipple et al. with the teachings of Okada because in column 2 lines 6 – 12, Whipple et al. teaches that the scanning of the rows in this manner will increase the readout of the sensor and will preserve the color pixel pattern of the sensor.

However, Okada in further view of Whipple et al. fails to teach that a first output, a second output, and a third output, the first output being a combination of the first color

component, the second color component, and the third color component weighted according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output. Endo et al., on the other hand teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output.

More specifically, Endo et al. teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio

(figure 5 items 51, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio (figure 5 items 52, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio (figure 5 items 53, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio); and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), a second image signal in response to the second output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), and a third image signal in response to the third output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Endo et al. with the teachings of Whipple et al. and Okada because in column 20 lines 59 *et seq.* Endo et al. teaches that the invention can be used to correct defective pixels.

However, Okada in further view of Whipple et al. and Endo et al. fails to disclose a signal processing circuit for applying predetermined signal processing to an image signal produced by the sample hold circuit, wherein the signal processing circuit generates a color component signal which approximates at least one color component among the first color component, the second color component, and the third color component, using the first image signal, the second image signal, and the third image signal.

The examiner takes Official Notice that it is old and well known in the art to have processing on a signal output from a sample and hold circuit such as combining of signals to output one reference value.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have signal processing on a signal output from a sample and hold circuit to improve image quality in a variety of ways including: sharpening, noise reduction, color manipulation, etc.

Regarding **claim 6**, as mentioned above in the discussion of claim 5, Okada in further view of Whipple et al. in further view of Endo et al. and in further view of Examiners Official Notice teaches all of the limitations of the parent claim. Additionally, Okada teaches that the first color component, the second color component, and the third color component are three optical primary colors, that is, red, green, and blue, and the second color component is green (paragraph 0040).

Regarding **claim 7**, Okada discloses an image capturing device, comprising: a solid Image capturing element having a plurality of light receiving pixels arranged in a matrix (figure 3 and 7, item 11i), for accumulating information charges therein, the light receiving pixels in an odd-numbered line being alternately correlated to a first color component and a second color component (figure 3; odd rows i.e. rows 1, 3, 5, etc. including colors R and G) and the light receiving pixels in an even-numbered line being alternately correlated to the second color component and a third color component (figure 3; even rows i.e. rows 2, 4, 6, etc. including colors G and B), the light receiving pixels being connected to a plurality of vertical shift registers (figures 3 and 7; item 11s, and paragraph 0038), outputs from the plurality of vertical shift registers being respectively coupled to respective bits of a horizontal shift register (figures 3 and 7; item 11h, and paragraph 0038), an output from the horizontal shift register being coupled to an output section (figures 3 and 7; paragraph 0019); a driving circuit for transferring the information charges accumulated in the plurality of light receiving pixels from the plurality of vertical shift registers to the horizontal shift register (figure 7; item 12), for combining, during a process of transferring the information charges, the information charges for every k-number of lines to thereby create a first combined charge and a second combined charge which are alternately accumulated in the respective bits of the horizontal shift register (paragraph 0041 *et seq.*; plurality of bit regions), sent from the horizontal shift register in the units of one bits, for m-number of bits in the output section (paragraph 0019 *et seq.*).

However, Okada fails to teach that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge. Whipple et al., on the other hand teaches that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge.

More specifically, Whipple et al. teaches that the first combined charge being a combination of the first color component and the second color component, the second combined charge being a combination of the second color component and the third color component, and for accumulating the first combined charge and the second combined charge (figure 5, and column 3 lines 1 *et seq.*; first output being a combination of G and R and the second output being a combination of B and G).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Whipple et al. with the teachings of Okada because in column 2 lines 6 – 12, Whipple et al. teaches that the scanning of the rows in this manner will increase the readout of the sensor and will preserve the color pixel pattern of the sensor.

However, Okada in further view of Whipple et al. fails to teach that a first output, a second output, and a third output, the first output being a combination of the first color

component, the second color component, and the third color component weighted according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output. Endo et al., on the other hand teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio, the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio, and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio; and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output, a second image signal in response to the second output, and a third image signal in response to the third output.

More specifically, Endo et al. teaches that a first output, a second output, and a third output, the first output being a combination of the first color component, the second color component, and the third color component weighted according to a first ratio

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(figure 5 items 51, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), the second output being a combination of the first color component, the second color component, and the third color component weighted according to a second ratio (figure 5 items 52, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio), and the third output being a combination of the first color component, the second color component, and the third color component weighted according to a third ratio (figure 5 items 53, and column 9 lines 6 *et seq.*; the signal is amplified with a amplification factor i.e. are given a weight/ratio); and a sample hold circuit for sampling an output from the solid Image capturing element to produce a first image signal in response to the first output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), a second image signal in response to the second output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted), and a third image signal in response to the third output (it is obvious when Endo et al. invention of multiple outputs are combined with Okada's sample and hold circuit as depicted in figure 7 item 14 image signals will be outputted).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Endo et al. with the teachings of Whipple et al. and Okada because in column 20 lines 59 *et seq.* Endo et al. teaches that the invention can be used to correct defective pixels.

However, Okada in further view of Whipple et al. and Endo et al. fails to disclose a signal processing circuit for applying predetermined signal processing to an image signal produced by the sample hold circuit, wherein the signal processing circuit generates a first color component signal which approximates the first color component or the third color component, using the first image signal, and a second color component signal which approximates the second color component, using the second image signal.

The examiner takes Official Notice that it is old and well known in the art to have processing on a signal output from a sample and hold circuit such as combining of signals to output reference values.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have signal processing on a signal output from a sample and hold circuit to improve image quality in a variety of ways including: sharpening, noise reduction, color manipulation, etc.

Regarding **claim 8**, as mentioned above in the discussion of claim 7, Okada in further view of Whipple et al. in further view of Endo et al. and in further view of Examiners Official Notice teaches all of the limitations of the parent claim. Additionally, Okada teaches that the first color component, the second color component, and the third color component are three optical primary colors, that is, red, green, and blue, and the second color component is green (paragraph 0040).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kikuchi et al. (US patent No. 6,005,612) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Kaji et al. (US patent No. 3,935,590) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Terada et al. (US patent No. 6,124,888) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Kiriyama et al. (US patent No. 6,493,025) teaches combining of charges and reading out in a vertical shift register to a horizontal shift register and addition of rows and pixels.

Yoneda et al. (US patent No. 6,952,228) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Misawa (US patent No. 6,677,998) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Kobayashi (US patent No. 6,157,407) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Hashimoto et al. (US patent No. 6,992,714) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Inokuma et al. (US PgPub 2003/0067550) teaches combining of charges and reading out in a vertical shift register to a horizontal shift register.

Yoneda et al. (US PgPub 2002/0067416) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Itano et al. (US PgPub 2002/0051071) teaches combining of Mosaic/Bayer filtered charges (i.e. one row of R and G the other of G and B pixels) charges and reading out in a vertical shift register to a horizontal shift register.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Usman Khan whose telephone number is (571) 270-1131. The examiner can normally be reached on Mon-Thru 6:45-4:15; Fri 6:45-3:15 or Alt. Fri off.

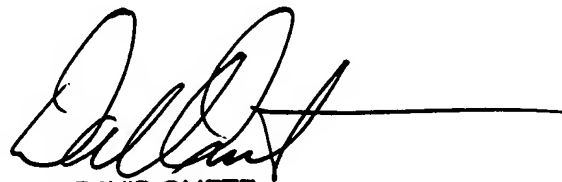
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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